What is claimed is:

1.   A high fill factor image array comprising,

a plurality of source-drain metal contacts disposed in an image array pattern,

5   a dual dielectric passivation layer that suppresses lateral leakage current comprising a first passivation layer and a second passivation layer deposited over the first passivation layer, wherein the thickness of the second passivation layer is less than the thickness of the first passivation layer,

a plurality of a patterned collection electrodes disposed on top of the

10   source-drain metal contacts,

a first doped silicon layer disposed over the collection electrodes,

a continuous layer of a-Si,

a continuous second doped silicon layer, and,

an upper electrode.

15   2.   The high fill factor image array of claim 1, wherein the first doped silicon layer is N+ doped a-Si.

3.   The high fill factor image array of claim 1, wherein the first passivation layer is silicon oxynitride, BCB, or a polyimide.

4.   The high fill factor image array of claim 1, wherein the second passivation layer is an oxide.

5.   The high fill factor image array of claim 1, wherein the continuous second doped silicon layer is P+ doped a-Si.

5   6.   The high fill factor image array of claim 4, wherein the second passivation layer has a thickness of about 1000 Å.

7.   A method for making a high fill factor image array comprising the steps:

    providing a plurality of source-drain metal contacts;

10   depositing a first passivation layer;

    depositing a second passivation layer that suppresses lateral leakage current;

    opening a plurality of via holes through the first and second passivation layers;

15   depositing a layer of conductive material;

    depositing a first doped a-Si layer;

    patterning to form the collection electrodes;

    depositing a continuous layer of i a-Si;

    depositing a continuous second layer of doped a-Si;

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depositing and patterning an upper conductive layer.

8.   The method for making a high fill factor image array according to claim 7, wherein the first passivation layer comprises silicon oxynitride, BCB, or a polyamide.

5   9.   The method for making a high fill factor image array according to claim 7, wherein the second passivation layer is an oxide.

10.   The method for making a high fill factor image array according to claim 7, wherein the second has a thickness of about 1000 Å.